

Abstract of the Disclosure

A capacitor having a tantalum-contained-dielectric layer is formed by a fabrication method including the steps of: forming a lower electrode on a semiconductor substrate; forming a dielectric layer containing Ta element on the lower electrode; forming a first TiN layer of an upper electrode on the dielectric layer by using atomic layer deposition; forming an oxidized TiN layer by performing an oxidation process on the dielectric layer; and forming a second TiN layer of the upper electrode on the oxidized TiN layer by using a plasma vapor deposition (PVD).